

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 C12Q1/68 C07D333/32 C12N15/11

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, MEDLINE, BIOSIS, EMBASE, CHEM ABS Data, Sequence Search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | WO 02/081735 A (BOISSINOT MAURICE ; INFECTIO DIAGNOSTIC INC (CA); LECLERC MARIO (CA);) 17 October 2002 (2002-10-17) the whole document | 1-36 |
| X | HO HOANG-ANH, ET AL.,: "colorimetric and fluorometric detection of nucleic acids using cationic polythiophene derivatives" ANGEW. CHEM. INT. ED., vol. 41, no. 9, 1 May 2002 (2002-05-01), pages 1548-1551, XP002313846 cited in the application the whole document | 1-36 |

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

18 January 2005

31/01/2005

Name and mailing address of the ISA

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Mueller, F

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|----------|--|-----------------------|
| A | EWBANK P C ET AL: "Amine functionalized polythiophenes: synthesis and formation of chiral, ordered structures on DNA substrates" TETRAHEDRON LETTERS, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, NL, vol. 42, no. 2, 8 January 2001 (2001-01-08), pages 155-157, XP004227724 ISSN: 0040-4039 see whole doc. esp. p.157, last par. ----- | |
| A | BOCK L C ET AL: "SELECTION OF SINGLE-STRANDED DNA MOLECULES THAT BIND AND INHIBIT HUMAN THROMBIN" NATURE, MACMILLAN JOURNALS LTD. LONDON, GB, vol. 355, no. 6360, 6 February 1992 (1992-02-06), pages 564-566, XP000453533 ISSN: 0028-0836 see whole doc. esp. Table 1 and Fig 2 ----- | |
| X,P | HO HOANG A. & LECLERC M.: "new colorimetric and fluorometric chemosensor based on a cationic polythiophene derivative for iodide-specific detection" J. AM. CHEM. SOC., vol. 125, 22 March 2004 (2004-03-22), pages 4412-4413, XP002313847 the whole document ----- | 1-36 |
| X,P | HO HOANG-ANH & LECLERC M.: "optical sensors based on hybrid aptamer/conjugated polymer complexes" J. AM. CHEM. SOC., vol. 126, 15 January 2004 (2004-01-15), pages 1384-1387, XP002313848 the whole document ----- | 1-36 |
| A | US 5 631 146 A (SZOSTAK JACK W ET AL) 20 May 1997 (1997-05-20) see esp. claims and seq id 82 ----- | |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/CA2004/000824

| Patent document cited in search report | Publication date | Patent family member(s) | | Publication date |
|--|------------------|-------------------------|---------------|------------------|
| WO 02081735 | A 17-10-2002 | WO 02081735 | A2 17-10-2002 | |
| | | CA 2442860 | A1 17-10-2002 | |
| | | EP 1373246 | A2 02-01-2004 | |
| | | JP 2004534013 | T 11-11-2004 | |
| | | US 2004171001 | A1 02-09-2004 | |
| US 5631146 | A 20-05-1997 | NONE | | |

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

REC'D 31 JAN 2005

WIPO

PCT

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

| |
|---|
| Date of mailing (day/month/year) see form PCT/ISA/210 (second sheet) |
|---|

| | |
|---|--|
| Applicant's or agent's file reference see form PCT/ISA/220 | FOR FURTHER ACTION See paragraph 2 below |
|---|--|

| | | |
|--|--|--|
| International application No. PCT/CA2004/000824 | International filing date (day/month/year) 03.06.2004 | Priority date (day/month/year) 03.06.2003 |
|--|--|--|

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|--|
| International Patent Classification (IPC) or both national classification and IPC C12Q1/68, C07D333/32, C12N15/11 |
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| Applicant INFECTIO DIAGNOSTIC (I.D.I.) INC. |
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1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

| | |
|--------------------------------------|--------------------|
| Name and mailing address of the ISA: | Authorized Officer |
|--------------------------------------|--------------------|



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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - a sequence listing
 - table(s) related to the sequence listing
 - b. format of material:
 - in written format
 - in computer readable form
 - c. time of filing/furnishing:
 - contained in the international application as filed.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/CA2004/000824

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or
industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|-------------------------------|------|--------|-----------------------|
| Novelty (N) | Yes: | Claims | 5-8,14-17,23-26,31-36 |
| | No: | Claims | 1-4,9-13,18-22,27-30 |
| Inventive step (IS) | Yes: | Claims | |
| | No: | Claims | 1-36 |
| Industrial applicability (IA) | Yes: | Claims | 1-36 |
| | No: | Claims | |

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item I

Basis of the report

Sequence listings filed, 2 pages, seq id 1-3, with the letter of 06.12.04, are filed after the filing date of the application and do not form part of the description and will not be annexed to this communication (Rule 13ter(f) PCT).

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1: WO 02/081735 A
- D2: HO HOANG-ANH, ET AL., ANGEW. CHEM. INT. ED., vol. 41, no. 9, (2002-05-01), pages 1548-1551,
- D3: EWBANK P C ET AL: "TETRAHEDRON LETTERS", vol. 42, no. 2, (2001-01-08), pages 155-157,
- D4: BOCK L C ET AL: NATURE, vol. 355, no. 6360, (1992-02-06), pages 564-566
- D5: HO HOANG A. & LECLERC M.: J. AM. CHEM. SOC., vol. 125, (2004-03-22), pages 4412-4413
- D6: HO HOANG-ANH & LECLERC M.: J. AM. CHEM. SOC., vol. 126, (2004-01-15), pages 1384-1387
- D7: US5631146

The present application refers to a method for identifying a target by using a target specific aptamer and a polymer of polythiophene structure. The target may be a potassium ion, organic molecule, protein etc. (page 8, l. 5ff.). The target is detected by a red shift of the fluorescence spectrum of the polymer (e.g. page 12, l.18 ff.). Figure 5 should demonstrate the shift of the fluorescence maxima for a target-containing and a target-free solution. However it seems that the shift is similar for the target containing and target-free solution (see Fig 5 , b,c,d).

Document D1, describes the use of the cationic polythiophene polymer of the present

application as optical sensor for the detection of nucleic acid sequences, see e.g. claims and figures. Also the publication of D2 refers to the use of polythiophenes for detection of nucleic acids. The prior art D1,D2 therefore is considered to fall within the scope of present claim 1 and is considered to be relevant according to Article 33(2)(3), see also item VIII, below. The same holds true for claims 2-4,9-13,18-22,27-30,

The aptamer sequence of claim 5 is known in the prior art (D4). The subject-matter of claim 5 therefore is considered as an obvious combination of known structural features from the prior art, see also D1/D2. An inventive step (Article 33(3) PCT) can therefore not be acknowledged. The same holds true for claims 6,24,25,23,24,31,32 and 35.

A partial homologue sequence of seq id 3 of claim 7 is disclosed in D7, US5631146, see seq id 82 which is suitable for the detection of D-adenosine. Without the identification of a special technical feature of seq id 3 an inventive step for claim 7 can therefore not be acknowledged (Article 33(3) PCT). The same holds true for claims 8, 16,17,25,26,33,34,36.

Re Item VII

Certain defects in the international application

The application should be self contained. Therefore the term ... incorporated by reference in their entirety." on page 2, l. 15 ff does not fulfil the requirements of the PCT-Guidelines C-II 4.17.

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1, is not mentioned in the description, nor are these documents identified therein.

The vague and imprecise statement "...and should not be interpreted as limiting the scope of the present invention." in the description on page 7, first paragraph, implies that the subject-matter or which protection is sought may be different to that defined by the claims, thereby resulting in a lack of clarity (Article 6 PCT) when used to interpret them (PCT Guidelines C-III, 4.3). The same holds true for paragraph 3 on page 8.

Re Item VIII

Certain observations on the international application

The optical sensor of claim 1 is not defined by structural features, no reference is given to the aptamer sequence, and therefore the scope of the claim is unclear (Article 6 PCT). Furthermore on page 2, line 19-20 it is mentioned that the optical sensor is based on a hybrid aptamer/conjugated polymer complex, this structural feature is not defined by the wording of the claim. The scope of the claim is thus not defined in such a way as to allow the skilled person to understand, without undue burden, which optical sensors are used for detecting a target.